

We Claim:

1. A method of making an optical waveguide in a substrate
material comprising

a) forming an opening in said substrate,

5 b) depositing a first cladding layer conformally in said

opening,

c) filling said opening with a core material;

d) removing excess core material, and

e) depositing a second cladding layer over the substrate.

10 2. A method according to claim 1 wherein said substrate is
selected from the group consisting of silicon, silicon-
germanium, gallium arsenide, indium gallium arsenide and
indium phosphide.

15 3. A method according to claim 2 wherein said substrate is
silicon.

4. A method according to claim 3 wherein said first and second
cladding layers are of silicon oxide each having a different
refractive index.

20 5. A method according to claim 1 wherein excess core material
is removed by chemical mechanical polishing.

6. A method of making an optical waveguide in a silicon-containing substrate having a layer of silicon nitride and a layer of silicon oxide thereon comprising
- 5 a) masking and patterning an opening in said mask,
- b) etching through the silicon oxide and silicon nitride layers to form a hard mask,
- c) etching an opening in said substrate,
- d) conformally depositing a first cladding layer of silicon oxide in said opening,
- 10 e) filling said opening with a core material having a different refractive index than said first cladding layer;
- f) planarizing the core and first cladding layer to remove said silicon oxide layer,
- g) etching said silicon nitride layer, and
- 15 h) depositing a second cladding layer having a different refractive index than the core material and the first cladding layer.
7. A method according to claim 6 wherein said substrate is silicon.
- 20 8. A method according to claim 6 wherein said substrate is silicon on insulator.